in the resolution of the bars and spaces of scanned code symbols and, often, intolerable symbol decoding errors.

Such variations result from the optical characteristics of the diffractive optical elements used therein. More specifically, the amplitude and direction (and other optical properties) of the diffracted light beam output from a diffractive optical element is sensitive to wavelength of the incident beam. In other words, the amplitude and direction of the diffracted light beam output from the diffractive element is a function of wavelength of the incident beam. Thus, variations in wavelength of the light beam incident on such diffractive optical elements can cause unwanted variations in amplitude and direction of the diffracted beam, which may result in non-uniform movement and distortion of the light beam directed through the scanning region and unwanted signal processing errors (for example, errors in the resolution of the bars and spaces of scanned code symbols and, often, intolerable symbol decoding errors) as described above.

Thus, there is a great need in the art for an improved diffractive-based laser scanning system that minimizes the effects of mode switching (shift in characteristic wavelength) of laser light sources employed therein, while avoiding the shortcomings and drawbacks of prior art diffractive-based scanning systems and methodologies.

OBJECTS AND SUMMARY OF THE PRESENT INVENTION

Accordingly, a primary object of the present invention is to provide a diffractive-based laser scanning system free of the shortcomings and drawbacks of prior art laser scanning systems and methodologies.

Another object of the present invention is to provide a diffractive-based laser scanning system (for example, holographic laser scanning system or holographic LDIP system) including mode switching detection elements that monitor a portion of the laser light beams produced by a laser light source and generate a mode switching control signal indicative of change in characteristic wavelength of the laser light beams generated by the laser light source; a temperature control element, in thermal contact with the laser light source, that is capable of adjusting temperature of the laser light source; and control circuitry, operably coupled between the mode switching detection elements and the temperature control element, that controls the temperature control element to adjust temperature of the laser light source based upon the mode switching control signal.